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The Web of Technics: Education and Lewis Mumford in the Information Age

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Introduction

> *The first important change in education today, if it is to meet the challenge of our time, is a change from the metaphysics of the machine, derived from the needs and interests of capitalism, to the metaphysics of the organism, directed to the needs and interests of the co-operative social order that is now emerging.*
>
> *Lewis Mumford (Values for Survival, 147)*

If the teachings of Lewis Mumford could be reduced to one simple idea, it is that our present institutions, whether technological or educational, do not serve the whole of human purposes. Organic life, and especially human life, is multifaceted, and yet the society Mumford saw around him did not befit the many-sided human, but rather served vast, mechanical, obsessively power-focused hierarchies. Mumford's prescriptions are all to do with balance and equilibrium: we should foster and maintain those parts of the human experience that have been ignored. "Of [life's] vast transformations", says Mumford, "only an infinitesimal part is visible or can be reduced to any mathematical order… that plenitude of life which even the humblest being in some degree exhibits… cannot be resolved in any mathematical equation or converted into a geometric metaphor without eliminating a large part of the relevant experience." (*Penatagon of Power*, 54).

While Mumford spent most of his career discussing technology and architecture, he devoted some of his time to addressing problems in education directly, and his ideas about the community, human connections, and the way that technologies influence our lives are invaluable to discussions of education today. The goal of education for Mumford is to cultivate the whole human personality, and to produce communities of interconnected, fully realized human beings, who could foster the growth of human values:

> Our problem is not, as some educators once thought, to adjust our education to the needs of a changing world: the problem is equally that of adjusting a changing world to the basic needs of education: meaning by education the harmonious cultivation of the entire personality, operating within the medium of a common culture, and within the frame of a going community. (*Values for Survival*, 204)

Mumford was concerned that society was being populated by fragmentary individuals, accustomed to being subjects of automated processes and unable to cultivate balanced personalities. While in his earlier writings, as can be seen in some of the essays on education collected in *Values for Survival*, Mumford saw his society on the brink of change, about to move away from the expansive structures of capitalism, later, as expressed in the two volumes of *The Myth of the Machine*, he became increasingly critical of the technocratic structures which continued to dominate society after the second World War and into the Nuclear Age. Today, in the Information Age, many of the trends Mumford discussed continue, and his ideas about technology, community, and education are useful in confronting the crises of our time. One need not be a philosopher of technology to realize that the invention of the World Wide Web has

massive effects on not just the makeup of society at large, but on the human personality. For Mumford, to discuss education was to discuss communities at large – the locus of educational efforts according to Mumford needed to be redirected to the community, to foster connections between individuals and between individuals and their historical, ecological, and technological environments. Today, the Web has become not just a part of those environments, but an entirely new type of environment. A discussion is needed about what exactly that kind of environment is, how it effects human personalities and communities, and how we can approach education through it for social goals.

The Use of the Web: Tool or Machine?

In *Technics and Civilization*, Mumford distinguishes between tools and machines. Tools are flexible devices inviting manual or otherwise active use, but as a tool leans more toward automation it leans more toward machinery: "The essential distinction between a machine and a tool lies in the degree of independence in the operation from the skill and motive power of the operator: the tool lends itself to manipulation, the machine to automatic action." (Technics and Civilization, 10). The Web, and the devices we use to access it, of course involves complex and automated mechanical processes. But it is useful to ask to what extent our use of the Web treats it like a tool or a machine – that is, to what extent is the Web a series of automated processes and to what extent does it involve our skillful and motivated participation?

To start, we need some definition of what the Web is. We might consider information to be the basic substance and language of the Web. More than anything, the Web is a complex array of interconnected information. Mumford was wary of the way information was treated even in his own time. In the *Pentagon of Power*, he warns: "To dismiss as non-existent what happens to be indescribable is to equate existence with information." (71). Unsurprisingly, he was critical of the factory-line university, which to his mind mechanized knowledge, so that fragments of information could be treated as "real" and valuable in themselves – with these assumptions, we "lose sight of the social destination of the goods in themselves" (*Values for Survival*, 202). Knowledge tends to be mechanized before machines, as in the case of the science that predates capitalist industry:

> Well before the automatic machines of the nineteenth century had been invented, science had perfected within its own realm a system of subdivided labor, operating with the standardized parts, confined to limited motions and processes, which paralleled in efficiency Adam Smith's favorite example of pin-making. (Pentagon of Power, 174)

Scientific papers, Mumford goes on to say, are mass-produced in a mechanized process of information gathering (ibid.).

If in Mumford's time we 'equated existence with information', then it is no wonder our own time is called the Information Age. We are now more than ever obsessed with encyclopedic collections of information, which we gather and publish on the Web in greater amounts than ever before. Many people today spend hours each day on the Web, absorbing this information through articles, videos, and forums. The more popular websites have adopted the model of a 'feed', an unending stream of information bits, such as that on Twitter or Facebook, often (as on Twitter) even limited to a discrete number of characters. Information is quantified, with the character, the update, the post as the basic units of measure. Even websites that aren't social networks are now

amalgams of links to other sites, like Reddit, where a user can scroll through a never-ending list of headline-like pieces of information. This information-gathering and information-production more and more becomes like an automated process, with no clear end or objective, other than perhaps some form of immediate gratification. The goal of reading the feed is just to read the feed, and the Web feeds users as they feed it back through their updates, in a sort of vicious cycle often leading nowhere. The feed of information is like a machine churning out links, Tweets, and updates. The Web involves participation, but participation does not mean tool-using; participation in the form of mere button-pushing, moving quickly from one bit to the next without concentration, skill, or motivated effort, takes the form of passiveness to a mechanical process. The Web is not a tool that invites manual use, but a machine that involves passivity and automation.

Of course, this only describes, briefly, the way in which the Web is most commonly treated. This treatment may be limited or deeply affected by the machine through which we use the Web – the computer. The Web, so far as it exists for us, seems not like a tangible thing but an emergent property out of a tangible mechanical system, so that pinning it down under the simple division of tool and machine may not be satisfactory to describe it in its complexity. A further distinction of Mumford's, between polytechnics and monotechnics, may be useful.

Polytechnics, Monotechnics, and Thinking with Many-Sided Minds

'Technics' is Mumford's way of referring to technology, in a broader sense than our common use. A definition of technics includes not only tools but also containers, utensils, and other structures, whether made by human or animal – for instance, the nests, dams, and hives made by birds, beavers, and bees (Technics and Human Development, 5). Technics refers not to any specific technology but the total technical equipment of a society.

Mumford's work in *The Myth of the Machine* differentiates between mono- and polytechnics. Polytechnics is rooted in ancient agrarian practices and dominated both the Neolithic and Medieval ages. It is all the technics which arise from a culture of craft skill and knowledge. Polytechnics occur when members of a community are not reduced to monotonous roles and inescapable occupations which disconnect them from the work of others. It is the technics of a system of labour based on "the needs, attitudes, interests of living organisms: above all on man himself" (Pentagon of Power, 155). Polytechnics help us "maintain a balance between the static and dynamic components of technics, between utilities and machines" (ibid., 145).

When a society tends toward mechanical development, and members are isolated and designated specific roles in increasingly mechanistic and automated processes, polytechnics turns into monotechnics. Monotechnics favours progress in the direction of increased power over interconnectedness. A monotechnical development, while more powerful, may be "less flexible and less efficient than the more diverse and many-paced system which preceded it", as in the case of cars or jet planes as means of transportation replacing horses (Pentagon of Power, 140). Whereas polytechnics does not restrict working skills, judgment, and understanding to separate occupations or castes, and therefore can not be "reduced to a single, standardized, uniform system, under centralized control" (ibid., 141), monotechnics tends toward uniformity.

The Web's status as polytechnical or monotechnical seems to hinge on two main features: (1) whether Web based-activity involves craft skill, or some digital equivalent, and (2) whether activities on the Web can be described as dynamic and connected to activities in a broader community, without being reducible to monotechnical uniformity.

While using the Web certainly doesn't involve the *manual* skill of polytechnics, it may have some comparable digital process. Web design, for instance, is an obvious case of skill applied to work in web-space. It involves much more than automated processes, even though it uses mechanical tools to do some of the work: it requires aesthetic choices, imagination, complex problem-solving, etc. Many other things involving craft skill are showcased on the Web, but only as a storage place – video production and art don't occur in the Web, but are only uploaded to it. Most web use, however, involves reading posts, looking at pictures – the passive activities described in the above section. Even education on the Web often takes the form of watching lectures, reading things, and taking multiple-choice quizzes; certainly not the dynamic, skill-based technical craft of polytechnics.

Education on the Web is often a more extreme version of the classroom education that likewise mechanizes knowledge: in large Web classrooms, such as the MOOCs (massive open online courses) that are growing in popularity, the Web is used to further disseminate information and evaluate information intake in a quantifiable way, rather than to further connections, participation, and involvement in a way that can't be done without the Web. These kinds of classrooms involve maximum uniformity. Polytechnics involves connections to the community and the human environment – although the Web provides the infrastructure for connections between people on a large scale, the kinds of communities it produces don't resemble the cooperative polytechnical environments of agrarian societies Mumford describes – perhaps because users on the Web aren't connected to human needs, communicating as they do without direct physical contact and without the common struggles of a shared neighbourhood or city. The qualities of Web communities will be discussed further in the next section – but first, a bit more exploration of the mindset of the Web is needed.

Mumford's definitions of polytechnics bear similarity to discussion in his earlier works of 'simultaneous thinking', a term borrowed from one of Mumford's prime influences, Patrick Geddes. Simultaneous thinking is thinking that is "many-sided" and "interrelated" – organic rather than mechanical (Values for Survival, 149). Mumford uses the example of a physician to illustrate this difference: the poor doctor thinks mechanically, looking at the heart, for instance, as an abstract piece of anatomy, related to thousands of other hearts like it, and proceeding alone based on various measurable qualities of that heart. The good doctor works organically, thinking of that heart as a particular heart, existing only in relation to the history of that particular body, related to the environment, nutrition, psychology, and physiology of the person (ibid., 148). Simultaneous or many-sided thinking examines all the relevant aspects of an issue as it relates to everything around it.

Our interactions on the Web certainly involve some thinking, and often what we now refer to as 'multitasking'. But multitasking isn't the same as the many-sided thinking Mumford describes. Moving sporadically from link to link or having disparate conversations across multiple devices or sites doesn't constitute the simultaneity described above, because the multitude of things under attention are often unrelated, or related by only some superficial stream of connections. True many-sided thinking involves something more like the doctor example: examining a subject by its relations in time and space to other things, rather than confining it to some reductive, quantitative measure. One might think that a system of hyperlinks, designed to connect information in a web-like structure, would allow for better many-sided thinking; but link-following can too often become tangential to the point of losing its original object, as the impulse to travel onward and onward in the stream of information, the impulse to use the machine as it is presented, grows stronger. Many-sided thinking requires some concentration on

an end goal and resistance to mechanical procedure – it needs to come back around to the root. For Mumford, the way to foster many-sided thinking was through the regional survey. To know how the Web could be employed to foster this organic model of thinking, and further to foster true polytechincal systems, we must define the regional survey and analyze its potential application to the Web.

Web Spaces and Regional Survey: What is a Community?

The regional survey, borrowed by Mumford from the work of Patrick Geddes and Victor Branford, is a process for educating students outside of the school and in their surrounding environments. It involves gathering through multiple means data about a region, the community and environment surrounding students, outlining the needs of the region and the processes through which to achieve social goals, and then imagining plans to reconstruct the region for improvement toward those goals (Conrad, 123). The survey is meant as a method of teaching from the ground up, teaching from the exploration and experience of students' lived environments rather than the passing on of pre-fabricated knowledge (Values for Survival, 151). It shifts the locus of education from the school to the region so that students can analyze and explore their region historically and spatially, and actively and collectively work to better it. Education is for Mumford a path to social betterment: "we cannot have social synergy without emotional synaesthesis and intellectual synthesis" (ibid., 145). Science and technology need "a social vehicle and a social goal" (ibid., 146) to be of worth to us. Regionalism becomes the vehicle to actualize knowledge socially – embedding students in the region raises awareness of social needs and differences, and provides relevant subject matter for otherwise abstract knowledge to be generated. As Stemhagen and Waddington put it in their paper comparing Mumford to his contemporary John Dewey:

> Although Mumford did not use this kind of rhetoric, regional survey was, in effect, an attempt to democratize science. It was designed to do more than make people aware or competent in scientific thinking – with this new tool, Mumford sought to foster agency among all community members so that they could use science to increase their understanding of and develop a love for their regional communities. (Stemhagen and Waddington, 485-6)

More particularly, the regional study attempts to create the holistic human being Mumford idealizes. As David R. Conrad explains in his book on Mumford, *Education for Transformation*:

> Regional survey is environmental education in the most inclusive sense, beginning with the child's home environment, reaching into his immediate neighborhood, his community, his region, and the entire earth. A mother's love and family's affection are the foundation of this education that continually demonstrates deep respect for all organic life; heightens awareness and understanding of one's conscious and unconscious fears, compulsions, desires; encourages fellowship and cooperation with one's brother and sister no matter where he/she may live; and provides tools of action for the reconstruction of society. Regional survey demands participation in the educational process at every stage and denies that certain individuals whether they be professors, religious leaders, or presidents have a monopoly on wisdom, truth, and power. (Conrad, 120)

Fostering regional relationships is the way, Mumford believes, to involve education in all those human qualities that traditional knowledge-giving cannot account for.

Of course, regionalism is not without its problems, as it risks a divisiveness between regions. Mumford believes that community relationships in the region will translate globally; understanding humanity at home means understanding it universally, and extending the needs of the community to the world. However, as Conrad warns us:

> His assumption is justified if regional appreciation does in fact lead to a more encompassing appreciation of all cultures and peoples, but sturdy roots in the region could also lead to blind worship of one's own region and prejudice toward others. Mumford seems at least partly cognizant of this danger in his attacks on sentimental regionalism. (Conrad, 121)

Stemhagen and Waddington express similar concerns, stating: "it is easy to see how regional survey could lead to a very provincial outlook; a more cosmopolitan approach might occasionally be needed." (485).

Two questions, then, stand before us: (1) whether the regional survey can exist on the Web, or at least make use of the Web in education; and (2) whether the Web, with its ability to make global connections, can compensate for the divisive tendencies of regionalism.

If a regional survey existed on the Web, it of course would take quite a different form than what Mumford imagined. The regional survey involves examinations of things in space – architecture and ecology. Web-space is not really space; it is a sort of unembodied space we imagine when we navigate between webpages. Students might very well examine the architecture of the Web, and because that is too vast they could examine the architecture of specific Web regions – a particular website, for instance. But this seems to get away from the point of the regional survey, which is to connect students with the needs of a community, to understand the connections between people living together. Instead the examination of the region on the Web might forgo analyses of space in favour only of analyzing human relationships on the Web. Students connected on the Web could map out relations between people, the various roles they play in the Web community of which they are a part, the needs they have and the ways in which those needs are met. This too, however, in its obscurity has missed out on what is fundamental to the survey. Because Web-based communities involve people not actually living together, the *physical* needs of the community are not collective, and so the regional survey, when confined only to the Web, does not analyze humanity in a holistic, ecological sense.

Aspects of the regional survey may nonetheless be useful in Web education. It reminds us that just as children educated in a city should learn about that city, students educated on the Web should learn about the environment they inhabit there. What they can't analyze in space they can analyze in time: to understand both the history of the Web and the potentialities of the Web for the future. And there is some 'space' that can be analyzed: the structural makeup of websites, the internet, the workings of software and hardware. Letting students understand the Web to imagine its future is, of course, only useful if the students have also some ability to work with the substance of the Web itself. Just as students would work towards understanding the needs of a region and working to meet them, so too could students work to build on the Web to better serve the needs of its users.

All of this only really becomes socially useful, however, when it ends in the real world. The Web might be, rather than a region itself, a tool for conducting regional surveys, and moreover of connecting disparate regions. It is easy to imagine how computers could aid in traditional regional surveys: to provide access to archival information about a region; to conduct various kinds of analyses about the geography, social makeup, etc. of the region; to use various kinds of software to design, plan, and map social projects. The Web could have various involvement in each of those tasks, mostly in the form of giving access to helpful information. More important, however, is the Web's ability to connect people from afar. If students from different regions connected on the Web, they could share experiences of their different regional analyses, fostering discussion about how the needs of different regions compare or differ. They might even find ways of cooperating, not simply through the sharing of information, but through negotiating real-world connections and building interregional networks – travelling to other communities, or exchanging cultural and practical goods. In an age where communication is so easy and immediate, it is a wonder that children in one school are not already communicating with children in other schools across wide networks to collaborate on both city-wide and intercity projects. If the regional survey was implemented, the Web could be an invaluable source for allowing regions to connect, overcoming the potential divisiveness of Mumford's regionalism and providing a more global understanding of humanity that was Mumford's ultimate goal.

Inner and Outer Order: Making Online Labour Work

Many of Mumford's ideas about labour and about human activity in general have their foundations in his understanding of internal processes. "Human development", says Mumford, "at every point rests upon the ability to sustain tensions and control their release", be those tensions the internal digestive system, sexual desires, or the promptings of imagination (Technics and Human Development, 71). Human beings are, he says, fundamentally symbol-making animals, and our ability to make symbols arises out of a need to order the complex thoughts bouncing about the human mind: "Through [our] overdeveloped and incessantly active brain[s], [we] had more mental energy to tap than [we] needed for survival at a purely animal level", so we canalized that mental energy into "appropriate cultural – that is, symbolic – forms." (ibid., 7). Human language and culture arose out of a need to master "the vagrant promptings of [our] hyperactive psyche" (ibid., 58). Our hyperactive minds, and the fantasies and dreams they produce, allowed us to build civilization but also run the risk of self-destruction: "If man had not encountered dragons and hippogriffs in dream, he might never have conceived of the atom… But if no sufficient outlet could be found, these same demonic powers might lead only to destructive activities" (ibid., 54). Indeed, the chief criticism of mechanistic hierarchical societies from Mumford is that ruling classes, with no ordered labour and thus no appropriate outlet for their mental powers, in combination with the fact that they are in positions of extraordinary power, become subject to the "obstreperous fantasies of the unconscious… giving play to sadistic impulses that hitherto had no collective outlet" (ibid., 229).

Clearly, we need appropriate outlets for our mental energies to maintain self-order in the truest sense: autonomy, or self-legislation. We shouldn't be completely subject to uniform, automated processes, nor should we be subject to unrestrained fantasies of power that populate unordered minds. In one place, Mumford notes:

> Instead of liberation *from* work being the chief contribution of mechanization and automation, I would suggest that liberation *for* work, for more educative, mind-forming, self-rewarding work, on a voluntary basis, may become the most salutary contribution of a life-centered technology. (Tool Makers, 388)

So, if the Web is to serve us it should not replace work but rather make better work possible. The Web needs to be able to foster a kind of labour that is self-directed; it needs to offer up space for us to use it in accordance with our own needs and wants – blank slates for us to work on rather than pre-fabricated, pre-ordered templates for us to fill out, as in social networking profiles or some of the more user-friendly, restricted-format blogging platforms.

Hubert L. Dreyfus uses Kierkegaard's writings on the press to analyze the Web's potential as an educational tool, and his conclusions are useful in helping us understand how work gets done on the Web. As Dreyfus explains, Kierkegaard was worried that the press created a *public*, in which all views could be reduced to the same level; no one person stands behind public views or assumes responsibility for them, no one is committed to public beliefs, and everyone is interested in such a wide array of things that they fail to distinguish the important from the trivial (Dreyfus, 462-3). Meaningful learning, for Kierkegaard and for Dreyfus, cannot really occur until the learner passes through three spheres: the aesthetic, where one gathers up information for the sake of itself; the ethical, where one begins to commit to particular beliefs and form an identity, but nonetheless choices can change so arbitrarily and easily that they become meaningless; and finally the religious, where unconditional commitments are made which determine who a person is, choices which, rather than being arbitrary, are made because they 'grab at' a person's whole existence (ibid., 643-5). According to Dreyfus, this last stage doesn't typically occur on the Web – in fact, the ease of changing one's opinion and stance online and the total lack of risk associated with asserting various ideas and opinions anonymously and from a distance inhibits users from making real commitments, and so gets in the way not only of successful learning but of self-development (645). To achieve real commitments, Dreyfus claims students need "a shared situation in the real world", that they need a kind of "learning by apprenticeship [which] can work only in the nearness of the classroom and laboratory; never in cyberspace" (646).

Now, fifteen years since the original publication of Dreyfus' essay, we still see anonymous users of the internet spouting uncommitted beliefs and jumping from article to article, idea to idea, with no risk of being accountable for wrongness. Even with the advent of social networking, where users *aren't* anonymous, we can still see the fragmentary identities of uncommitted persons, caught in a frenzy of ever-changing information, travelling from link to link without deep involvement with any one thing on anything but a superficial level. With no embodiment, there is very little risk associated with any belief or idea: no one can hurt you if they disagree with you, and there is even no sense really that anyone will, because any reactions to your comments or posts won't be immediate, likely won't be from people you know and so can easily be written off, and are often moderated by yourself, subject to deletion. Even more than this, the frenzied nature of a giant feed or stream of information has the effect of pulling a user further and further along a path of information that never stops long enough in any one place for deep commitments to occur. Imagine the 'slacktivist' who, rather than organizing a protest or boycott on an issue they are committed to, signs every online petition and uses every awareness-raising hashtag that comes their way.

Mumford's organic thinking, polytechnical systems, and regional activities are all designed to foster commitments, to involve a person deeply in their human conditions and the conditions of those around them, always in a socially-directed manner. Dreyfus' depictions of the Web can serve as a warning and a summary of the ways in which the Web can undermine and inhibit those commitments. To effectively employ Mumford-esque education on the Web and to foster real commitments seems in each case to require the same solution: placing the Web in the hands of its users, and directing the Web towards real social goals. If a person is involved in the creation of Web structures, they will already be more deeply committed to them, and able to approach the Web in a more dynamic, ordered yet self-directed fashion. If the ultimate goals of actions on the Web are always connected to society, then there is real, embodied risk associated with the commitments of that work, and the work done on the Web becomes more meaningful. As it stands now, most Web users don't seem to have very much skill in manipulating the Web, or if they have any it isn't used often. Instead the Web becomes as unorganized as Mumford takes our unrestrained thoughts to be: it is a dizzying mess of images, fantasies, desires. Restraining the Web requires gaining manual control of it and directing it to social use.

Final Cautionary Words

Even decades ago, Mumford was wary that the technocratic society of the 20th century was leading down a path to total control through increased technological power. In the two volumes of his seminal work, *The Myth of the Machine*, Mumford discusses at length the "megamachine" – a hierarchical social structure which treats individuals as mechanical parts, first emerging in ancient Pyramid Age cultures and re-emerging in the industrial era. Discussing the Nazis in *The Pentagon of Power* (volume two of *The Myth of the Machine*) in 1970, Mumford says: "the Germans not merely enlarged the dimensions of the ancient megamachine, but made important innovations in the techniques of mass control: innovations that later corporate megamachines are now perfecting with the aid of spying devices, opinion polls, market research, and computerized dossiers on private life" (250). Clearly, the trends that Mumford cautioned about are alive today, in the age of data-mining online advertisers and NSA spying.

Like all technologies, the Web, and the internet in general, is a powerful thing. Like all powerful mechanical systems, it tends towards automation, uniformity, and top-down order. To make use of the Web, we must make it less mechanistic and more organic; we must place on it social controls, to turn uniformity into unity and automation into usefulness. The best way of doing this seems to be first of all to empower users of the Web to actually *use* it, rather than passively receive it – to manipulate their digital environments as they can physical ones, to create web-spaces on their own terms from their own labour. Not to upload the prescribed 'selfies' and home videos or to fill out descriptions in pre-fabricated profile templates, but to truly become architects of web-space, and to understand the web spatially and temporally. More than this, the resultant labour of the web must be directed to social use. When humanity loses sight of any social goal, technological systems will run their course without us, making us passive subjects of their automation. Only when we empower ourselves to wrest control of the Web can we undermine that risk. Only when education occurs on the Web for the Web and for human social goals will that education be of use to humanity.

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